

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A cooling device for an electronic equipment, comprising:
a cooling panel [(2)] including a bottom heat radiation plate [(23)] and a top heat radiation plate [(24)], at least one of which is provided with a groove [(231)], said bottom heat radiation plate [(23)] and top heat radiation plate [(24)] being bonded together to form a passage [(21)] of refrigerant; and
a circulation pump [(3)] fixed onto said cooling panel [(2)] to circulate said refrigerant through said passage [(21)] for radiating heat transferred to said cooling panel [(2)], wherein:
said top heat radiation plate is provide with an inlet port [(27)] through which said refrigerant flows from said passage to said circulation pump and an outlet port [(26)] through which said refrigerant flows from said circulation pump to said passage; and
said circulation pump [(3)] is fixed onto said inlet port [(27)] and outlet port [(26)].
2. (Currently Amended) The cooling device for an electronic equipment according to claim 1, wherein said circulation pump [(3)] is a piezoelectric pump.
3. (Currently Amended) The cooling device for an electronic equipment according to claim 2, wherein said piezoelectric pump [(3)] includes a pump housing [(321)] defining a pump chamber [(319)] receiving therein a piezoelectric vibration plate [(313)], and said pump housing [(321)] is fixed onto said cooling panel [(2)] so that said discharge port [(316)] and said suction port [(315)] are aligned with said inlet port [(27)] and said outlet port [(26)], respectively.
4. (Currently Amended) The cooling device for an electronic equipment according to claim 2, wherein a check valve [(317)] is provided in operative relationship with each of said discharge port [(316)] and said suction port [(315)], and said check valve

[[317]] is fixed onto a member [[322]] which is detachably attached onto said pump housing [[319]].

5. (Currently Amended) The cooling device for an electronic equipment according to claim 3, wherein said piezoelectric vibration plate [[313]] has a bimorph structure including an elastic circular plate and a pair of piezoelectric ceramic circular plates sandwiching therebetween said elastic circular plate and polarized in opposite directions to each other, each of said pair of piezoelectric ceramic circular plates has a layered structure including a plurality of ceramic layers, and adjacent two of said ceramic layers in said layered structure are polarized in opposite directions to each other.

6. (Currently Amended) The cooling device for an electronic equipment according to claim 1, wherein said piezoelectric vibration plate [[313]] includes a pair of first piezoelectric ceramic elements not polarized, a pair of second piezoelectric ceramic elements sandwiching therebetween said first piezoelectric ceramic elements and polarized in opposite directions to each other, and a pair of third piezoelectric ceramic elements disposed outside said second piezoelectric ceramic elements and not polarized, and wherein each of said second piezoelectric ceramic elements has a layered structure including a plurality of ceramic layers, adjacent two of said ceramic layers in said layered structure are polarized in opposite direction to each other, and said first through third piezoelectric ceramic elements are sintered to form an integral structure.

7. (Currently Amended) The cooling device for an electronic equipment according to claim 1, wherein a reinforcement [[22, 22A]] is formed in said groove [[231]] for reinforcing bonding of said bottom heat radiation plate [[23]] and said bottom heat radiation plate [[24]].

8. (Currently Amended) The cooling device for an electronic equipment according to claim 1, further comprising a reservoir [[4, 411]] communicated with a branch hole [[43, 412]] and fixed onto said top heat radiation plate [[24]] of said cooling panel [[2]] and formed in said passage [[21]].

9. (Currently Amended) The cooling device for an electronic equipment according to claim 8, wherein a taper ~~[(41)]~~ of a circular truncated cone or truncated pyramid having an apex at an exit of said branch hole ~~[(43)]~~ is formed on a bottom surface of said reservoir ~~[(4)]~~.

10. (Currently Amended) The cooling device for an electronic equipment according to claim 9, wherein a volume of said reservoir ~~[(4)]~~ below said apex of said taper is larger than a volume of said reservoir above said apex of said taper (41), and said refrigerant fills said reservoir ~~[(4)]~~ so that a liquid level is located above said apex of said taper ~~[(41)]~~.

11. (Currently Amended) The cooling device for an electronic equipment according to claim 9, wherein a protrusion ~~[(42)]~~ having an area smaller than a cross-sectional area of said branch hole ~~[(43)]~~ is formed on top of said reservoir ~~[(4)]~~ at a position opposing said branch hole ~~[(43)]~~.

12. (Currently Amended) The cooling device for an electronic equipment according to claim 1, wherein a portion of said passage ~~[(21)]~~ is replaced by a micro-channel structure ~~[(12)]~~ including a plurality of narrow grooves having a width smaller than a width of said groove ~~[(231)]~~.

13. (Currently Amended) The cooling device for an electronic equipment according to claim 12, wherein a guide plate ~~(161, 162, 163)~~ is formed between said passage ~~[(21)]~~ and said micro-channel structure ~~[(12)]~~ for enlarging flow of said refrigerant from a width of said passage up to a width of said micro-channel structure.

14. (Currently Amended) The cooling device for an electronic equipment according to claim 13, wherein said guide plate includes a plurality of guide plates, and wherein one ~~[(161)]~~ of said guide plates is longer than another ~~(162, 163)~~ of said guide plates located at downstream of said one ~~[(16)]~~ of said guide plates, and has a larger angle with respect to a flow direction of said refrigerant than said another ~~(162, 163)~~.

15. (Currently Amended) The cooling device for an electronic equipment according to claim 1, wherein said passage [(21)] is coated with metal.

16. (Currently Amended) A cooling device for an electronic equipment, comprising a substrate [(20)], a passage embedded in said substrate [(20)] and passing therethrough refrigerant, a circulation pump [(3)] disposed on a surface of said substrate [(2)], and a reservoir (4, 411) communicated with said first passage via a branch hole, wherein said circulation pump [(3)] circulates said refrigerant through said passage [(21)] to radiate heat transferred to said substrate [(20)].

17. (Currently Amended) The cooling device for an electronic equipment according to claim 16, wherein said reservoir [(4)] is laid-down-type reservoir fixed onto said surface of said substrate [(20)].

18. (Currently Amended) The cooling device for an electronic equipment according to claim 16, wherein said reservoir [(411)] is a standing-rest-type reservoir installed within said substrate [(20)].

19. (Currently Amended) An electronic equipment having mounting thereon [(the)] a cooling device for an electronic equipment, ~~according to any one of claims 1 to 18.~~ the cooling device comprising:

a cooling panel including a bottom heat radiation plate and a top heat radiation plate, at least one of which is provided with a groove, said bottom heat radiation plate and top heat radiation plate being bonded together to form a passage of refrigerant; and

a circulation pump fixed onto said cooling panel to circulate said refrigerant through said passage for radiating heat transferred to said cooling panel, wherein:

said top heat radiation plate is provide with an inlet port through which said refrigerant flows from said passage to said circulation pump and an outlet port through which said refrigerant flows from said circulation pump to said passage; and

said circulation pump is fixed onto said inlet port and outlet port.